

**CLAIMS**

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. Process for producing a three-dimensional bioartificial tissue having viable cells in or on a matrix and with which the cells and matrix can be cultivated to a tissue or a precursor of it, comprising the steps of:
  4. inserting at least one vessel supplied from the outside into a tissue at the beginning of its production; and
    6. cultivating said tissue in a manner of hereby vessels propagate into the tissue and a vascularized bioartificial tissue is obtained.
1. 2. Process according to Claim 1, wherein vessels are of natural origin selected from the group consisting of humans and animals.
1. 3. Process according to Claim 1, wherein the vessel is a synthetic vessel, produced from a biologically compatible polymer.
1. 4. Process according to Claim 1, wherein the vessel has lateral openings departing from a longitudinally extended vessel lumen.  
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1. 5. Process according to Claim 1, wherein the vessel is a porous vessel..
1. 6. Process according to Claim 5, further comprising the step of preparing the porous vessel punctually with a substance or means initiating a stimulus for vascular propagation.

1       7.     Process according to one of Claims 1 further comprising the step of the  
2     vessel supplying perfused with blood or a culture medium.

1       8.     Process according to Claim 7 wherein substances promoting  
2     angiogenesis, particularly growth factors, preferably VEGF (vascular  
3     endothelial cell growth factor) are added to the culture medium.

1       9.     Process according to Claim 7 wherein the perfusion is accomplished  
2     under pressure.

1       10.    Process according to Claims 7 wherein the perfusion is accomplished  
2     in pulses.

1       11.    Process according to Claims 7 wherein the vessel is held between inlet  
2     and outlet lines needed for the perfusion so that it is simultaneously  
3     positioned and fixed in relation to the tissue being cultivated.

1       12.    Process according to Claim 1 wherein cardiomyocytes are used as cells  
2     within the three-dimensional tissue to be vascularized, and the tissue obtained  
3     is a bioartificial heart tissue.

1       13.    Process according to Claim 1 wherein keratinocytes are used as the  
2     cells, and the tissue obtained is a bioartificial skin tissue.

1       14.    Vascularized bioartificial tissue, particularly obtained according to  
2     Claim 1 wherein at least one vessel passes through said tissue from which  
3     other vessels are propagated into the tissue.

1       15.    Vascularized bioartificial tissue according to Claim 14 wherein in that  
2       vessel is selected from the group consisting of a vessel of natural origin from  
3       human or animal, and a biocompatible synthetic vessel.

1       16.    Vascularized bioartificial tissue according to Claim 14 wherein the  
2       tissue is a synthetic heart tissue having cardiomyocytes in a matrix.

1       17.    Vascularized bioartificial tissue according to Claim 14 wherein the  
2       tissue is a synthetic skin tissue having keratinocytes in a matrix.

1       18.    Experimental reactor for controlled production of a bioartificial tissue,  
2       according to Claim 1, at least one tissue culture chamber; at least one inlet  
3       and outlet for said tissue culture chamber; and two opposite, plane, parallel  
4       and optically transparent boundary walls for said tissue culture chamber.

1       19.    Experimental reactor according to Claim 18, further comprising at  
2       least one closable inlet and outlet for each chamber; and a closing means.

1       20.    Experimental reactor according to Claim 18 wherein said tissue  
2       culture chamber includes a means for holding a matrix or a vessel.

1       21.    Experimental reactor according to Claim 18 wherein said at least one  
2       inlet and one outlet hold a vessel.

1       22.    Experimental reactor according to Claim 18 wherein at least one of  
2       the plane optically transparent boundary walls of the chamber is designed as a

3 lid.

1 23. Experimental reactor according to Claim 23 further comprising  
2 additional input points above each chamber in a replaceable lid.

1 24. Experimental reactor according to Claim 18 further comprising  
2 electrical connections and/or electrical components are provided in said at  
3 least one tissue culture chamber.

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